

IN THE SPECIFICATION:

Please replace paragraph number [0021] with the following rewritten paragraph:

[0021] The apparatus and methods of the present invention apply a modified Fick Equation to calculate changes in partial pressure of carbon dioxide ( $P_{CO_2}$ ), flow, and concentration to evaluate the cardiac output or pulmonary capillary blood flow of a patient. The traditional Fick Equation, written for  $CO_2$  is:

$$Q = \frac{V_{CO_2}}{(C_{vCO_2} - C_{aCO_2})},$$

where  $Q$  is pulmonary capillary blood flow ("PCBF"),  $V_{CO_2}$  is the output of  $CO_2$  from the lungs, or " $CO_2$  elimination," and  $C_{aCO_2}$  and  $C_{vCO_2}$  are the  $CO_2$  contents of the arterial blood and venous blood  $CO_2$ , respectively. It has been shown in the prior work of others that cardiac output can be estimated from calculating the change in the fraction or volume of  $CO_2$  exhaled by a patient and the partial pressure of end-tidal  $CO_2$  as a result of a sudden change in ventilation. That can be done by applying a differential form of the Fick Equation, as follows:

$$Q = \frac{V_{CO_{21}}}{(C_{v1} - C_{a1})} = \frac{V_{CO_{22}}}{(C_{v2} - C_{a2})},$$

where  $C_{aCO_2}$   $C_a$  is the  $CO_2$  content of the arterial blood of a patient,  $C_{vCO_2}$   $C_v$  is the  $CO_2$  content of the venous blood of the patient, and the subscripts 1 and 2 refer to measured values before a change in ventilation and measured values during a change in ventilation, respectively. The differential form of the Fick Equation can, therefore, be rewritten as:

$$Q = \frac{V_{CO_{21}} - V_{CO_{22}}}{(C_{v1} - C_{a1}) - (C_{v2} - C_{a2})}$$

or

$$Q = \frac{\Delta V_{CO_2}}{\Delta C_{aCO_2}} = \frac{\Delta V_{CO_2}}{s \Delta P_{etCO_2}},$$

where  $\dot{V}CO_2$  is the change in  $CO_2$  elimination in response to the change in ventilation,  $\dot{C}Ca_{CO_2}$  is the change in the  $CO_2$  content of the arterial blood of the patient in response to the change in ventilation,  $\dot{C}Pet_{CO_2}$  is the change in the partial pressure of end-tidal  $CO_2$ , and  $s$  is the slope of a  $CO_2$  dissociation curve known in the art. The foregoing differential equation assumes that there is no appreciable change in venous  $CO_2$  concentration during the re-breathing episode, as demonstrated by Capek. Also, a  $CO_2$  dissociation curve, well known in the art, is used for determining  $CO_2$  concentration based on partial pressure measurements.

Please replace paragraph number [0038] with the following rewritten paragraph:

[0038] FIG. 6 is a schematic representation of an alternative embodiment similar to the embodiment shown in ~~FIGs.~~ FIGS. 5A-5C, wherein the volumes of the inspiratory course and expiratory course of the breathing circuit are adjustably expandable;